JOURNAL OF HEALTH DIPLOMACY

The Global Polio Eradication Initiative in India: An analysis of international and national level perspectives on its efficacy

Adèle Langlois*

Citation: Langlois, A. (6 May 2014). The Global Polio Eradication Initiative in India: An analysis of international and national level perspectives on its efficacy. Journal of Health Diplomacy, online.
Editor: Rachel Irwin, Stockholm International Peace Research Institute
Managing Editor: Mark Pearcey, Carleton University
Type: Research Article – Peer Reviewed

***School of Social and Political Sciences, The University of Lincoln, Lincoln, UK. Email: alanglois@lincoln.ac.uk

Notice of Correction: This article was revised and reposted on 6 May 2014. The text has been reformatted, with one revision to text on page 2. *The sentence reads: As both Feldbaum and Michaud (2010) and Lee and Smith (2011) demonstrate in their review articles, definitions range from the processes by which improvements in global health are sought ("multi-level and multi-actor negotiation processes that shape and manage the global policy environment for health" (Kickbusch, Silberschmidt & Buss, 2007)) to a means by which foreign policies are effected ("winning hearts and minds of people in poor countries by exporting medical care, expertise and personnel to help those who need it most" (Fauci, 2007)).*

The Global Polio Eradication Initiative in India: An analysis of international and national level perspectives on its efficacy

Adèle Langlois

Abstract
In 1988, the World Health Organization launched the Global Polio Eradication Initiative (GPEI), which has become the biggest international public health effort to date. By 1999, the annual caseload had reduced by an estimated 99 per cent and polio is now endemic to only three countries. Yet support is not universal. This article analyses Indian medical journals and GPEI documents from 2004 onwards to determine the range of views on polio eradication efforts in India, where transmission of the disease was declared interrupted in early 2012. One group of public health professionals believe the GPEI was forced on their country, to the detriment of other health programmes. A second set, who are broadly supportive of the initiative, question why Indian experts were not consulted about the best way to administer polio vaccines in the Indian context. Specifically, they have concerns about the safety of oral polio vaccination (the method recommended by the World Health Organization), the impact on other health services and the apparent distrust of the programme among some marginalised communities. Using the global health diplomacy literature as a framework for discussion, the article concludes that if the GPEI is to achieve maximum efficiency and certify the world as polio-free by 2018 (the latest goal), it must pay greater heed to expert and lay voices from the contexts in which it operates.

Introduction

In 1984, Rotary International established PolioPlus, its biggest volunteering and fundraising programme to date (Rotary International, 2013). Inspired by these efforts, the World Health Assembly launched a public-private partnership, the Global Polio Eradication Initiative (GPEI), in 1988. It set the year 2000 as its target for the eradication of poliomyelitis (polio), deeming this, if met, an "appropriate gift, together with the eradication of smallpox, from the twentieth to the twenty-first century" (WHO, 1988). The four 'spearheading' GPEI partners are Rotary International, the World Health Organization (WHO), the United Nations Children's Fund (UNICEF) and the US Centers for Disease Control and Prevention (CDC). The Bill and Melinda Gates Foundation is also a major contributor (GPEI, 2010b). While the initial target was missed (polio remained in 20 countries across three regions in 2000), the programme has made significant progress (Arita & Francis, 2011). Polio is now endemic to only three states (Nigeria, Afghanistan and Pakistan), although there have been outbreaks in neighbouring countries (Arita & Francis, 2011; The Persistence of Polio, 2012). In May 2012 the World Health Assembly declared polio eradication "a programmatic emergency for global public health," simultaneously making eradication a priority and highlighting its challenges (WHO, 2012b).

Infectious diseases are notoriously difficult to eradicate. The campaign to rid the world of smallpox has been the only one to succeed (Barrett, 2003). Global eradication can be achieved only if the "weakest link" country eliminates the disease in question (Barrett, 2006). In the case of polio this was previously thought to be India, the country with the second largest population in the world; Bruce Aylward, former director of the GPEI, once remarked, "If the polio virus was to pick its last stand, its Alamo, so to speak, it would head for Uttar Pradesh" (Donnelly, 2007). Yet there have been no incidences of the disease since January 2011 and, should this remain the case, India will formally be declared polio free in January 2014 (John, 2012). This article examines eradication efforts in India in the context of global health diplomacy. Although it appears these efforts have ultimately been successful, they have not been without conflict or controversy. Several Indian public health professionals and other stakeholders have objected to various aspects of the GPEI's operations within their country. Dissecting how such tensions arise and how they might be resolved can help us to better understand the dynamics of global health initiatives.

Global health diplomacy

Global health diplomacy (GHD) is an emerging field of enquiry, as the founding of this journal testifies. In recent years several scholars have attempted to demarcate this field, in terms of what GHD involves, who does it and how it should be studied. As both Feldbaum and Michaud (2010) and Lee and Smith (2011) demonstrate in their review articles, definitions range from the processes by which improvements in global health are sought ("multi-level and multi-actor negotiation processes that shape and manage the global policy environment for health" (Kickbusch, Silberschmidt & Buss, 2007)) to a means by which foreign policies are effected ("winning hearts and minds of people in poor countries by exporting medical care, expertise and personnel to help those who need it most" (Fauci, 2007)). The analysis in this article sits at the Kickbusch et al. end of the spectrum. That is to say, it considers the diplomacy *of* polio eradication, rather than

diplomacy *through* polio eradication, by analysing different stakeholder perspectives and the degree to which these have been heard.[1]

Several GHD scholars highlight the important role that non-state actors play in GHD (Adams, Novotny & Leslie, 2008; Kickbusch, 2011; Lee & Smith, 2011). Non-governmental organisations, activists, academics, health professionals and the private sector can all contribute, although those 'at the coalface' of vaccination programmes may have little experience of international negotiations (Katz et al., 2011; Lee & Smith, 2011). Although the GPEI is led by national governments (GPEI, 2010b), the impact of non-state actors has been considerable, not least financially. By way of example, as Prime Minister David Cameron announced in 2011 that the UK would increase its funding from £20 million to £40 million ($60 million), Bill Gates added $100 million to his foundation's already sizeable contribution (Zaracostas, 2011). Rotary International has raised more than $1 billion to date (Rotary International, 2013) and the Gates Foundation has since pledged a further $1.8 billion, a third of the total budget for the 2013-18 strategic plan. To encourage other donors, the 2016-18 tranche will only be released when the GPEI has secured the remaining two thirds of the funding (Bill & Melinda Gates Foundation, 2013). This level of influence from non-state actors raises several research questions for GHD scholars. Adams, Novotny and Leslie (2008) have raised concerns about the nature of the interaction between these donors and recipient governments. More broadly, Lee and Smith (2011) ask: (a) how do different actors participate in GHD? (b) what determines their power and influence? and (c) which actors are under-represented? This article seeks to answer these questions in the context of polio eradication in India. It finds that there has been a disjuncture between the national and global levels, which has hampered the GPEI's operations. The two versions of the polio story which follow the methodology section below give a flavour of this disjuncture. The article then presents a brief overview of polio as a disease and provides a systematic review of the different tensions and controversies in the Indian case. It ends with a discussion of the data in relation to the GHD literature, arguing that better communications between stakeholders might have quickened elimination of polio from India.

Methodology

This article was inspired by preliminary fieldwork for a bioethics project, conducted in Delhi, Mumbai, Pune and Kolkata in 2008. Forty-two informal meetings were held: 12 at universities or research institutions; 7 at research active NGOs; 21 with other NGOs; one with someone from the private sector; and one with a journalist. Through these conversations the story of polio eradication in India gradually emerged, but as they were not formal interviews none are quoted here. To garner a range of views on polio, systematic searches of academic databases and relevant websites were subsequently performed. In December 2008 the Web of Knowledge database generated 40 sources on the topic "Global Polio Eradication Initiative" dating back to 1992 and 139 sources on the topic "polio" back to January 2006. From September 2009 to June 2013 the Zetoc Alert Service provided 219 relevant matches for "polio". In addition, the websites of the WHO, the GPEI, India's National Polio Surveillance Project (NPSP) and the journals

[1] Examining the GPEI as a foreign policy tool and/or liability would be equally valid avenues of enquiry. There are human security implications should eradication fail and it was misperceptions of Western states' foreign policies that halted polio vaccinations in Kano state in Nigeria in 2003. Vaccinations only restarted after intense diplomatic efforts (Katz et al., 2011).

Indian Pediatrics, *Indian Journal of Medical Research*, *The National Medical Journal of India* and *Economic and Political Weekly* (an Indian social sciences journal and commentary on current affairs to which academics and activists contribute) were all searched for relevant information. Although there has been scepticism about the polio eradication campaign in India since its inception (Huang, 2013), the article draws mainly on sources published within the last decade. Beyond the search terms articulated above, a grounded theory approach to the data was employed; that is, the analytical themes discussed below—the programme as an entity, programme governance, type of vaccine used, impact on other health services and community engagement—were suggested by the data rather than preordained. To give a sense of the strength of feeling in India and to allow the data to 'speak' for itself, several sources are quoted verbatim. Key stakeholders and commentators are: public health professionals and medical academics in India, including members of the Indian Academy of Pediatrics; social scientists; and members of communities served by the polio eradication programme.

Story 1. When the GPEI was launched in 1988, there were an estimated 350,000 cases of polio occurring across 125 countries annually (WHO, 2012a). By 1999, the annual caseload had reduced by 99% and by late 2003 polio was endemic to only six countries, including India (WHO, 2003; WHO 2012a). In 2004, as the WHO was on the brink of ridding the world of polio, the state of Kano in Nigeria had suspended vaccinations, in "a triumph of superstition over science" (Another Health Disaster in Africa, 2004).[2] The programme recovered after successful diplomatic intervention (Kaufman & Feldbaum, 2009) and innovations in vaccine research renewed hope in the eradication endeavour, with successful trial results being published in *The Lancet* and the *New England Journal of Medicine* (Grassly et al., 2007; Jenkins et al., 2008; Sutter et al., 2010). At the June 2010 Rotary International Convention, Bruce Aylward, then director of the GPEI, told supporters, "in the past twelve months you have proved, without a doubt, that polio can be eradicated" (Grahl, 2010). The incremental net benefits of the GPEI from 1988 to 2035 have been estimated at $40-50 billion, with 85 per cent of these attributed to low income countries (Tebbens et al., 2011).

Story 2. In 1988, when the GPEI was launched, 32,419 cases of polio were reported worldwide. The WHO increased this figure tenfold, arguing that the reported cases could only be a small sample of the true number (Sathyamala et al., 2005). In the *Geneva Declaration for the Eradication of Poliomyelitis* of January 2004, this estimate became 350,000 reported cases, "by a magical stroke of the keyboard" (Sathyamala et al., 2005). A few months later, a group of sixteen public health professionals from India sent a memorandum to the WHO India office, UNICEF and the Government of India, voicing their concern at the way in which "the entire polio eradication 'initiative' has been thrust on our country" (All India Drug Action Network, 2008). Two of the signatories, with a third colleague, wrote to *The Lancet* in 2007, expressing their dismay that it should have seen fit to publish the results of a polio vaccine study conducted in India which they considered unethical (Puliyel, Sathyamala & Banerji, 2007). Other experts cast doubt on whether eradication was achievable and instead advocated a control programme (Arita, Nakane & Fenner, 2006; Yadav et al., 2009;

[2] The state government suspended vaccinations, under pressure from militant Muslim clerics, who claimed that the vaccination programme was a western plot to render girls infertile (see BBC, 2003 & 2004).

Emerson & Singer, 2010; Jack, 2011). Estimated at $8 billion (Calloway, 2013), the costs of the initiative have spiralled rapidly, to the detriment of other health priorities.

Polio—an overview

Polio is a virus spread through person-to-person contact, usually via the faecal-oral route (that is, through contaminated food and water). It is known for its crippling effects on people's limbs, but this occurs in only one in every 200 infections, when the virus reaches the central nervous system. Most people have no symptoms and do not know they are infected, which makes monitoring the spread of the disease very difficult. A single case of polio paralysis is thus evidence of a possible epidemic (GPEI, 2010c). There are three strains of poliovirus—type 1, type 2 and type 3—and two main types of vaccine, oral and injected. No cases of wild type 2 virus have been detected since 1999, but wild (as opposed to vaccine-derived) types 1 and 3 are found in the remaining endemic countries (GPEI, 2010d). The possibility of transmission of poliovirus across borders is a constant threat (GPEI, 2013).

The GPEI is based largely on a strategy of immunisation in endemic countries through oral poliovirus vaccines (OPVs). The WHO recommends and funds OPVs over the alternative injectable kind (inactivated polio vaccines or IPVs) for areas where the disease is endemic, as they have the advantage that non-vaccinated children may develop immunity through the faecal-oral route (Dawson & Paul, 2006). They are also considerably cheaper (Calloway, 2013). A trivalent version of OPV was the vaccine of choice for many years, as it combated all three strains of the virus. While it was effective in eliminating type 2 virus, it was less successful against types 1 and 3. More recently, monovalent vaccines targeting either type 1 or 3 have been trialled and used and in 2009 a bivalent vaccine to tackle both types was developed (Aylward & Tangermann, 2011). But there is a complication, in that the live viruses in OPVs can mutate and cause paralysis in both vaccine recipients and third parties (again, through faecal-oral transmission). This is called vaccine associated paralytic poliomyelitis (VAPP) and is particularly likely to occur in individuals with compromised immune systems. Many developed countries have switched to IPV to avoid the threat of VAPP (Paul & Dawson, 2005; Dawson & Paul, 2006).

The National Polio Surveillance Project (NPSP), a joint initiative between the Government of India and the WHO, is responsible for implementing the GPEI in India. It is the Ministry of Health's most expensive public health programme to date. In 2007, for instance, India spent more on polio eradication than on all other disease control programmes and by August 2012 had contributed a total of more than $2 billion to the eradication effort (John, 2007; Roberts, 2012). By 2001, polio remained primarily in two states, Uttar Pradesh and Bihar, where dense populations and low standards of living rendered it stubbornly resistant (Donnelly, 2007; Chowdhary & Dhole, 2008; Paul, 2008; Chatterjee, Vidyant & Dhole, 2013). As in other countries, routine immunisation in India (with OPV) is supplemented with National Immunization Days (NIDs; also known as Pulse Polio Immunisation, or PPI), which include house-to-house 'mop-up' rounds (Nair, 2002). The aim of the PPI initiative, which began in 1995, was to eradicate polio by 2000 and certify India as polio-free five years later (Jeffery & Jeffery, 2010). Although this target was missed by almost a decade (in fact the number of cases surged from 66 in 2005 to 676 in 2006 (NPSP, 2011)), generally PPI is seen as one of the key factors behind the eventual elimination of the disease, together with the introduction of

the bivalent vaccine in 2010 (John & Vashishtha, 2012; Chatterjee, Vidyant & Dhole, 2013; Vashishtha & Kumar, 2013).[3]

Review of perspectives on polio in India

As outlined above, perspectives on polio eradication in India can be categorised into five themes: the programme as an entity, programme governance, type of vaccine used, impact on other health services and community engagement.

The programme as an entity

Views on polio in India range from opposition to the eradication programme as a whole to specific technical and ethical concerns. As an example of the former, in a 2007 *Indian Journal of Medical Research* editorial, paediatricians Puliyel, Gupta and Mathew objected to the Indian government having to borrow $180 million to finance the programme, once "donor fatigue" in the wake of an initial grant of $20 million had set in. Echoing the group of public health professionals who had sent the memorandum to WHO India and partners in 2004, they claimed that polio eradication had not been a public health priority in developing countries when the GPEI began in 1998 (Puliyel, Gupta & Mathew, 2012). Other health professionals have seen such stances as unhelpful and urged broad support for the programme. John, a past president of the Indian Academy of Pediatrics (IAP) and chair of the NPSP's India Expert Advisory Group (set up in 1999 to monitor progress and provide technical advice (NPSP, 2005)), responded to the 2004 memorandum in another *Indian Journal of Medical Research* editorial. He acknowledged that aspects of the eradication programme were "debatable", but encouraged people to choose duty over dissent and refrain from fuelling controversies, so as not to compromise the eradication effort (John, 2004a). In the wake of adverse media reports, he and fellow members of the IAP Polio Eradication Committee made a second plea in a 2006 *Indian Pediatrics* editorial, asking IAP members and other health professionals to "uphold the morale of the workers and the trust of the families" and to "refrain from creating or spreading messages of despair and disharmony" (John, Shah & Thacker, 2006). More recently, John and Vashishtha (Convener of the IAP Committee on Immunization) have described the apparent elimination of wild polio from India as "a shot in the arm of GPEI" (John & Vashishtha, 2012), while Puliyel and fellow paediatrian Vashisht have declared the amount developing countries have been asked to spend on polio eradication relative to other diseases as unethical. They see the GPEI as a warning against vertical, disease specific programmes in the future (Puliyel & Vashisht, 2012).

Programme governance

John has himself been critical of the eradication programme in India, particularly with regard to its governance. He has expressed dissatisfaction with the way in which the Ministry of Health set up the Indian programme without recourse to expertise within the country, stating, "The MoH did not ask the Indian Council of Medical Research (ICMR) or National Institute of Communicable Diseases (NICD), both wings under its control, to verify conclusions of earlier Indian studies or provide scientific basis for strategy-design and mid-course corrections. Science was neglected due to blind faith in the prescriptions of GPEI, which had always disregarded Indian research" (John, 2007).

[3] With the exception of 2002, the number of cases each year from 2000 to 2005 was significantly lower than in the late 1990s (NPSP, 2011). Some critics attributed these falling numbers to changes in the modes of case definition and calculation rather than real progress in preventing transmission (Sathyamala et al., 2005).

Agarwal (2008), another past President of the IAP, has similarly complained that the GPEI in India has been prejudiced against indigenous expert advice. The Grassly et al. study cited in *Story 2* had shown that, in areas where the efficacy of orally administered vaccines is compromised by diarrhoea and other infections, a monovalent vaccine is almost three times as effective against type 1 polio as the trivalent vaccine. This led the GPEI to devise a strategy to tackle the different polio viruses separately in Uttar Pradesh and Bihar, the remaining polio strongholds, with type 1 to be tackled first. Agarwal (2008) commented, "Though, technically the decision may have some merits, but on moral and ethical grounds, the decision raises certain serious concerns" (namely that if the trivalent vaccine was not used, people would be exposed to the risk of contracting type 3 polio, which is just as debilitating as type 1). The IAP thus recommended a "judicious mix" of both, rather than one followed by the other (Agarwal, 2008). Its predictions were borne out. The 2010-12 GPEI strategic plan noted, "Optimizing the impact of the new monovalent OPVs has proven more complicated than anticipated and in some settings contributed to alternating outbreaks of the remaining wild poliovirus type 1 (WPV1) and wild poliovirus type 3 (WPV3) serotypes" (WHO, 2010). (The introduction of the bivalent vaccine in 2010 eventually neutralised this problem).

Choice of vaccine

Another debate has centred on whether OPV should be used at all, or whether IPV would be a preferable alternative. Several commentators in India have been deeply critical of the reliance on oral vaccines, believing this to be based on economic rather than medical or moral grounds. Puliyel, with Madhavi, a scientist at the National Institute of Science, Technology and Development Studies, has described the NPSP as the "organ" of the WHO in this respect (Puliyel & Madhavi, 2008). Using polio as an example of what they identify as a wider problem of vaccines being foisted on developing countries, they warn, "Developing countries cannot expect international agencies like WHO to be an honest broker between themselves and private for-profit vaccine manufacturers. The public need to maintain a healthy skepticism of the 'facts and figures' provided by vested interests and of the international agencies that are influenced by such vested interests" (Puliyel & Madhavi, 2008).

Perhaps surprisingly, John has been no less disparaging. He has repeatedly called for a switch to IPV, most recently in a 2012 paper entitled "Inactivated Poliovirus Vaccine: The Fog of Uncertainty is Lifting!" In 2006 he labelled OPV the "mascot" of the WHO, alleging that the organisation continued to push its use because it maintains ownership of the original Sabin strains. He derided the view that OPV is superior in some circumstances because of faecal-oral transmission of immunity as "a ruse to justify OPV" and a "dogma" that was "scientifically discredited" in the 1970s and 1980s. Those countries that make decisions independently of the WHO, he noted, use IPV (John, 2006a; John, 2006b). According to John, in the 1980s public and private sector companies in India began to manufacture IPV, but were shut down when the government did not grant the necessary licences, against the advice of Indian scientists (John, 2005; John, 2006a; John, 2006b; John & Vashishtha, 2009). Polio experts both in and outside of India would now like to see IPV production set up in developing countries to bring costs down and thus render a worldwide switch to IPV viable (Emerson & Singer, 2010 Heinsbroek & Ruitenberg, 2010; Arita & Francis, 2011; Aylward & Tangermann, 2011; John & Vashishtha, 2012; Chatterjee, Vidyant & Dhole,

2013). The GPEI is itself moving towards this position (Aylward & Tadataka, 2011; WHO, 2013).

The relatively small group of people whose health is directly and adversely affected by the administration of OPV must also be considered; that is, those who contract VAPP. The WHO's 1998 definition of polio eradication referred to wild poliovirus only, a situation which John (2004b) described as leaving "much to be desired." (In a major change from previous plans, the draft Polio Eradication and Endgame Strategic Plan 2013-18 aims to eradicate vaccine-derived polio as well as wild forms (WHO, 2013)). VAPP occurs on average only once in every 2.7 million first doses of OPV (GPEI, 2010a), but given the frequency and pervasiveness of vaccination[4] and the size of the population, a significant number of children in India have been affected (Paul & Dawson, 2005). Paul and Dawson (2005), a paediatrician and ethicist respectively, would like "at the very least" to see compensation made available for those who contract VAPP. John (2006a) has similarly stated that children paralysed through VAPP in India are not compensated, or even recognised and that, at a minimum, the ethical response would be free treatment and rehabilitation.

Effects on other health services

The polio eradication programme may have also indirectly affected the health of a great number of people in India, through its impact on health services provision. International and national level assessments of this impact are quite different. In its polio factsheet, the WHO (2012a) states, "In most countries, the global effort has expanded capacities to tackle other infectious diseases by building effective surveillance and immunization systems." The draft 2013-18 GPEI strategic plan makes a similar claim (WHO, 2013) and Rath et al. (2012), writing in the *Expert Review of Vaccines*, maintain that the GPEI has helped to improve the general delivery of preventive healthcare. By contrast, Yadav and colleagues from the All India Institute of Medical Sciences have calculated that the "massive mobilization" of resources for PPI in India has had a negative bearing on other services (outpatient care, emergency and maternal services and routine immunisation), which are all suspended for the 3-4 days of each pulse polio round (Yadav et al., 2009). Others in India have likewise contended that other health programmes have been adversely affected by the focus on polio (John, 2006b; Vashisht & Puliyel, 2012; Vashishtha & Kumar, 2013). With finite overall funding available, programmes to combat diseases such as tuberculosis, malaria and diarrhoea may have suffered (although John (2013) now hopes that resources from the polio campaign will be targeted at routine immunisation against measles and other diseases). Jeffery and Jeffery (2010), sociologists with longstanding research interests in India, report that in 2005-6 in Uttar Pradesh, fewer than one in four children received the full routine immunisation package against tuberculosis, measles, diphtheria and polio, but that almost nine in every ten had been covered by the polio programme. Writing in the context of global health diplomacy more generally, Adams et al. (2008) concur with these findings, arguing that disease-specific programmes such as the GPEI may have weakened public health infrastructure, by not paying sufficient attention to how they integrate with national bodies.

[4] Through the combination of routine vaccinations and the NIDs, children can receive ten or more doses in the first five years of life, rather than the originally recommended three (Paul & Dawson, 2005; Sathyamala et al., 2005; John, 2007; Jeffery & Jeffery, 2010). Sathyamala et al. (2005) have pointed out that the safety of these high doses has not been clinically tested.

The focus on polio vaccination has not only affected efforts to combat other diseases and to provide basic health services, the critics say, it has also been detrimental to the polio eradication endeavour itself. Yadav et al. (2009) and Jeffery and Jeffery (2011) believe that limited resources could have been much better spent on improving water quality and sanitation, which would have helped combat transmission of several water-borne diseases, including polio. Gupta and Puliyel have made a similar point, describing themselves thusly in a 2007 letter in the *Indian Journal of Medical Research*: "The authors are active paediatricians who have deep interest in eradicating polio and who have worked to make the programme a success, but that has not blinded them to the folly of reaching out with more and more doses of vaccines, where attention to water and sanitation can yield more returns." Chakravarthi, a public health researcher, claims that the WHO was warned by virologists in 1997 that eradication would only be successful as part of a larger health and sanitation campaign, but chose to ignore their advice. She is critical of PPI as a "purely technical approach to public health" (Chakravarthi, 2009).

Community engagement

One of the reasons John et al. (2006) appealed to medical colleagues to refrain from fuelling controversy was because of the effect this can have on acceptance of public health initiatives among recipient communities. The GPEI recognises that community engagement is a key aspect of the eradication effort in its draft strategic plan for 2013-2018 (WHO, 2013). This is an area where the Indian programme has had difficulties in the past. Health problems such as the re-emergence of diphtheria have had a negative effect on how the eradication effort is viewed among both health professionals and communities subjected to more and more 'mop-up' polio vaccination operations (Jeffery & Jeffery, 2010). In their research in the Bijnor district of Uttar Pradesh, Jeffery and Jeffery (2010) discovered that some parents were being strongly persuaded or even coerced into taking part in the programme. This lost goodwill in the community, with villagers complaining that the already inadequate government health services were being undermined by the PPI (Jeffery & Jeffery, 2010). Similarly, Hussain, an anthropologist and medical student who conducted fieldwork in Uttar Pradesh in 2009, found that a one-sided view of OPV is presented in social mobilisation campaigns encouraging parents to take their children to NIDs (described as UNICEF's "propaganda machinery" by Sathyamala et al. (2005)), as the potential risk of VAPP is not elucidated (Hussain et al., 2012).

According to Paul and Dawson (2005) and Hussain et al. (2012), proponents of the programme have justified this one-sided presentation of the facts on the grounds that, if informed consent were sought, parents might decide not to vaccinate their children, with consequences for the greater good through a loss of confidence in vaccination for polio or other diseases. For Yadav et al. (2009), this is not sufficient: "The fact that little effort is made to obtain the informed consent of the parents of vaccinated children, as they are not currently told about the potential limitations of OPV or the possibility of vaccine-induced harm raises a serious ethical issue… The minimal but very real risk of VAPP that every child immunized by OPV is exposed to can no longer be ignored on the pretext of the larger public good." In general, the programme is seen as operating in a 'top-down' way by its detractors. Dasgupta, a community health specialist, believes this is ultimately to its disadvantage, as when communities are not involved in decision-making scepticism and distrust are likely to be the result, especially among already

marginalised groups (Dasgupta, 2009). Surveys of private sector paediatricians and public sector physicians conducted in Uttar Pradesh and Bihar in 2009-10 and 2006-9 respectively showed that they believed parental lack of awareness, poor confidence in the vaccines, superstition, religious beliefs and fear of side effects to be the most significant barriers to polio eradication (Thacker et al., 2012). But Taylor (2009), who worked with programme partners in several countries from 2002 to 2007, sees such blaming of local ignorance as the "politically safer" option, which perhaps fails to recognise that broader socioeconomic problems inform "people's capacity for rational, considered, and strategic non-compliance" in polio and other immunisation programmes. In this context, information and education may not be enough to turn the tide.

Discussion

In the context of the 'emerging infectious diseases' paradigm, Farmer (2001) asks, "Why are some epidemics visible to those who fund research and services, while others are invisible?" Polio is certainly a visible disease on the world stage—it has engendered the biggest international public health programme to date (UNICEF, 2012)—but some assessments of the worth and success of this programme have been more visible than others. This reflects Farmer's analysis of the emergence of the paradigm as a whole. He writes, "Popularizing the concept of 'emerging infectious diseases' has helped to marshal a sense of urgency, notoriously difficult to arouse in large bureaucracies. Funds have been channeled, conferences convened, articles written, and a dedicated journal founded" (Farmer, 2001). In the polio case, the eradication effort has most certainly generated a sense of urgency (despite numerous deadlines being missed), large funds (that some feel would be better employed elsewhere) and articles in several prominent journals (such as *The Lancet*). Yet, as Farmer cites as a possible danger when a worldview becomes popularised, this may have excluded alternative viewpoints, particularly those from the ground level. Indeed, the April 2004 memorandum to WHO India and partners went unacknowledged.[5]

Exploring this aspect of polio eradication in India may help to realise the research agenda set by Lee and Smith (2011), in terms of the different actors involved (or not) in global health diplomacy (GHD) and their relative power and influence. Katz et al.'s (2011) three categories of GHD—core, multistakeholder and informal—are helpful here. Core diplomacy is concerned with formal negotiations between states; multistakeholder diplomacy includes other actors and does not necessarily end in binding agreements; and informal diplomacy constitutes "interactions between international public health actors and their counterparts in the field, including host country officials, nongovernmental organizations, private-sector companies, and the public" (Katz et al., 2011). While not all those in India who write about polio hold the same views as those who signed the memorandum, the consensus does appear to be that, when polio was still endemic in their country, Indian voices (community or expert) were not given sufficient consideration by those who decide policy at the global level. Nor have concerns about the GPEI been unique to India. In her ethnography of Pakistan's eradication programme, Closser (2010) records examples of tensions between national and international level administrations. An Independent Monitoring Board, set up in 2010, published a frank report on the GPEI in October 2011, suggesting

[5] Informal meetings with three of the signatories, Delhi and Pune, August 2008.

that its overly optimistic "nearly there" culture rendered it blind to its operational inefficiencies and dismissive of external criticism (IMB, 2011; Roberts, 2012). Katz et al. (2011) consider the GPEI to fall within the multistakeholder category, but—although we can only speculate—had the programme embraced informal diplomacy and heeded warnings 'from below' about monovalent OPVs, sanitation and community perceptions, India might have eliminated polio earlier.

The cessation of transmission in India is seen as a major milestone and has renewed hope that polio can be eradicated, not merely controlled (John & Vashishtha, 2012; Mohammadi, 2012). In April 2013, 458 experts from 80 countries, including 29 from India, signed a *Scientific Declaration on Polio Eradication* stating that eradication is indeed achievable (Bhutta & Orenstein, 2013; Emory Vaccine Center, 2013). Yet the tensions and controversies surrounding the Indian programme in the last decade or so highlight the difficulties in balancing different imperatives: to engender and maintain support for global efforts to control infectious disease while also allowing debate on scientific uncertainties and societal costs and benefits. This has implications for the emerging field of global health diplomacy. Katz et al (2011) write, "Expanding demands on global health diplomacy require a delicate combination of technical expertise, legal knowledge, and diplomatic skills that have not been systematically cultivated among either foreign service or global health professionals. Nonetheless, high expectations that global health initiatives will achieve development and diplomatic goals beyond the immediate technical objectives may be thwarted by this gap." The Indian polio case shows that this gap may mean that the technical objectives are not achieved either, or at least not as quickly as they could be.

Conclusion

The Global Polio Eradication Initiative is a massive and long-standing international health programme that has received support from an array of well-respected organisations, but has also encountered criticism at the country level. The Indian case shows that global health diplomacy as a practice is hard. If health programmes are to run at maximum efficiency, informal diplomacy must be employed. Messages from the ground, such as the need for adequate sanitation alongside vaccination, need to be heard. Where this is perceived not to happen, controversies may escalate, breeding distrust and potentially undermining eradication efforts. This is now acknowledged by the GPEI. The Independent Monitoring Board's 2011 report led to a shake-up of the programme's management structure and culture, to make it less hierarchical (Roberts, 2012). More broadly, the challenge remains for global health diplomacy as a nascent field of scholarship to explore ways in which the diplomacy of global health initiatives can be more inclusive of national level voices, in a manner that leads to efficacious governance and implementation.

Acknowledgements: The idea for this paper came out of the author's work as a member of the International Science and Bioethics Collaborations project at the University of Cambridge, which was funded by the ESRC in the UK. The author would like to thank Ana Jordan for her advice on the initial draft and the two anonymous reviewers for their very helpful and insightful comments

Disclaimer of interest: None declared.

References

Adams, V., Novotny, T., & Leslie, H. (2008). Global Health Diplomacy. *Medical Anthropology: Cross-Cultural Studies in Health and Illness*, 27(4), 315-323.

Agarwal, R.K. (2008). President's Page: Polio Eradication in India: A Tale of Science, Ethics, Dogmas and Strategy! *Indian Pediatrics*, 45(5), 349-351.

All India Drug Action Network. (2008, August 12). *Memorandum on Polio Eradication Initiative in India: Submitted to the World Health Organization, UNICEF, and the Government of India, on 7 April 2004, The World Health Day*. Retrieved March 2, 2013, from:
http://aidanindia.wordpress.com/2008/08/12/memorandum-on-pulse-polio/.

Another Health Disaster in Africa. (2004, June 23). *The Economist*. Retrieved October 27, 2008, from:
www.economist.com/agenda/displaystory.cfm?story_id=E1_NSRGTGR.

Arita, I., & Francis, D. (2011). Safe Landing for Global Polio Eradication: A Perspective. *Vaccine*, 29(48), 8827-8834.

Arita, I., Nakane, M., & Fenner, F. (2006). Is Polio Eradication Realistic? *Science*, 312(5775), 852-854.

Aylward, B., & Tadataka, Y. (2011). The Polio Endgame. *New England Journal of Medicine*, 364(24), 2273-2275.

Aylward, B., & Tangermann, R. (2011). The Global Polio Eradication Initiative: Lessons Learned and Prospects for Success. *Vaccine*, 29(S4), D80-D85.

Barrett, S. (2003). Global Disease Eradication. *Journal of the European Economic Association*, 1(2-3), 591-600.

_____. (2006). The Smallpox Eradication Game. *Public Choice*, 130(1-2), 179-207.
BBC. (2003, December 12). Kano Shuns Nigeria Polio Campaign. Retrieved April 18, 2011, from:
http://news.bbc.co.uk/1/hi/world/africa/3313419.stm.

_____. (2004, January 16). Nigeria's Muslim Clerics Fear Polio Vaccine. Retrieved April 18, 2011, from:
http://news.bbc.co.uk/1/hi/world/africa/3400651.stm.

Bhutta, Z., & Orenstein, W. (2013). Scientific Declaration on Polio Eradication. *Vaccine*, 31(27), 2850-2851.

Bill & Melinda Gates Foundation. (2013, April 23). Global Leaders Support New Six-Year Plan to Deliver a Polio-Free World by 2018. Retrieved June 21, 2013, from: www.gatesfoundation.org/Media-Center/Press-Releases/2013/04/Global-Leaders-Support-New-Six-Year-Plan-to-Deliver-a-Polio-Free-World-by-2018.

Calloway, E. (2013). Vaccine Switch Urged for Polio Endgame. *Nature*, 485(7432), 293.

Chakravarthi, I. (2009). Ignored Outcomes of Polio Eradication. *Economic and Political Weekly*, 44(35), 69-71.

Chatterjee, A., Vidyant, S., & Dhole, T. (2013). Polio Eradication in India: Progress, but Environmental Surveillance and Vigilance Still Needed. *Vaccine*, 31(9), 1268-1275.

Chowdhary, R., & Dhole, T. (2008). Interrupting Wild Poliovirus Transmission Using Oral Poliovirus Vaccine: Environmental Surveillance in High-risks Area of India. *Journal of Medical Virology*, 80(8), 1477-1488.

Closser, S. (2010). *Chasing Polio in Pakistan: Why the World's Largest Public Health Initiative May Fail*. Nashville, Tennessee: Vanderbilt University Press.

Dasgupta, R. (2009). Eradicating Polio: Making a Short Story Long. *Economic and Political Weekly*, 44(25), 10-12.

Dawson, A., & Paul, Y. (2006). Mass Public Health Programmes and the Obligations of Sponsoring and Participating Organisations. *Journal of Medical Ethics*, 32(10), 580-583.

Donnelly, J. (2007, November 27). Anti-polio campaign gets $200 million infusion . *The New York Times*. Retrieved June 28, 2013, from: www.nytimes.com/2007/11/27/world/americas/27iht-polio.1.8494839.html?_r=0.

Emerson, C., & Singer, P. (2010). Is There an Ethical Obligation to Complete Polio Eradication? *The Lancet*, 375(9723), 1340-1341.

Emory Vaccine Center. (2013, April 14). Scientific Declaration on Polio Eradication – All Signatories. Retrieved June 18, 2013, from: http://vaccines.emory.edu/poliodeclaration/signatories.html.

Fauci, A. (2007). The Expanding Global Health Agenda: A Welcome Development. *Nature Medicine*, 13(10), 1169-1171.

Farmer, P. (2001). *Infections and Inequalities: The Modern Plagues*. Berkeley & London: University of California Press.

Feldbaum, H., & Michaud, J. (2010). Health Diplomacy and the Enduring Relevance of Foreign Policy Interests. *PLoS Medicine*, 7(4), 1-6.

GPEI. (2010a, November 19). Oral polio vaccine (OPV). Retrieved June 28, 2013, from: www.polioeradication.org/Polioandprevention/Thevaccines/Oralpoliovaccine(OPV).aspx

_____. (2010b, October 22). Partners. Retrieved June 20, 2013, from: www.polioeradication.org/Aboutus/Partners.aspx.

_____. (2010c, October 26). Polio and Prevention. Retrieved April 19, 2011, from: www.polioeradication.org/Polioandprevention.aspx.

_____. (2010d, November 5). The Virus. Retrieved June 20, 2013, from: www.polioeradication.org/Polioandprevention/Thevirus.aspx.

_____. (2013, May 23). Infected Countries. Retrieved June 20, 2013, from: www.polioeradication.org/Infectedcountries.aspx.

Grahl, A. (2010, June 22). Eradicating Polio is the World's Obligation. *Rotary International News*. Retrieved April 18, 2011, from: www.rotary.org/en/mediaandnews/news/pages/conv10june22_polio.aspx.

Grassly, N., et al. (2007). Protective Efficacy of a Monovalent Oral Type 1 Poliovirus Vaccine: A Case-control Study. *The Lancet*, 369(9570), 1356-1362.

Gupta, M., & Puliyel, J. (2007). Author's Response. *Indian Journal of Medical Research*, 125(5), 696-698.

Heinsbroek, E., & Ruitenberg, E.J. (2010). The Global Introduction of Inactivated Polio Vaccine can Circumvent the Oral Polio Vaccine Paradox. *Vaccine*, 28(22), 3778-3783.

Huang, Y. (2013). Enter the Dragon and the Elephant: China's and India's Participation in Global Health Governance. *Council on Foreign Relations International Institutions and Global Governance Program Working Paper*, April 2013.

Hussain, R.,et al. (2012). Fatigue and Fear with Shifting Polio Eradication Strategies in India: A Study of Social Resistance to Vaccination. *PloS One*, 7(9), 1-8.

IMB. (2011). *Report: October 2011*.

Jack, A. (2011, January 27). Gates Polio Goals Questioned. *Financial Times*. Retrieved April 18, 2011, from: www.ft.com/cms/s/0/9044b19c-2a44-11e0-b906-00144feab49a.html#axzz1JseltG00.

Jeffery, P., & Jeffery, R. (2010). Polio in North India: What Next? *Economic and Political Weekly*, 45(15), 23-26.

_____. (2011). Underserved and Overdosed? Muslims and the Pulse Polio Initiative in Rural North India. *Contemporary South Asia*, 19(2), 117-135.

Jenkins, H., et al. (2008). Effectiveness of Immunization Against Paralytic Poliomyelitis in Nigeria. *New England Journal of Medicine*, 359(16), 1666-1674.

Katz, R., et al. (2011). Defining Health Diplomacy: Changing Demands in the Era of Globalization. *The Milbank Quarterly*, 89(3), 503-523.

John, T.J. (2004a). The Vicissitudes of Global Eradication of Polio. *Indian Journal of Medical Research*, 120(1), 1-3.

_____. (2004b). Who Benefits from Global Certification of Polio Eradication? *Indian Journal of Medical Research*, 120(5), 431-433.

_____. (2005). Will India Need Inactivated Poliovirus Vaccine (IPV) to Complete Polio Eradication? *Indian Journal of Medical Research*, 122(5), 365-367.

_____. (2006a). Establish Herd Effect to Interrupt Wild Poliovirus Transmission. *Indian Journal of Medical Research*, 124(1), 1-4.

_____. (2006b). Polio Eradication: A National Commission Required. *Economic and Political Weekly*, 41(51), 5229-5234.

_____. (2007). Polio Eradication & India – Bringing Science into Public Health. *Indian Journal of Medical Research*, 125(2), 92-93.

_____. (2012). Inactivated Poliovirus Vaccine: The Fog of Uncertainty is Lifting! *Indian Pediatrics*, 49(10), 787.

_____. (2013, April 13). India's Great Polio Legacy [Electronic version]. *The Wall Street Journal, India*. Retrieved June 18, 2013, from: http://blogs.wsj.com/indiarealtime/2013/04/13/indias-great-polio-legacy/.

John, T.J., & Vashishtha, V. (2009). Eradication of Vaccine Polioviruses: Why, When & How? *Indian Journal of Medical Research*, 130(5), 491-494.

_____. (2012). Path to Polio Eradication in India: A Major Milestone. *Indian Pediatrics*, 49(2), 95-98.

John, T.J., Shah, N., & Thacker, N. (2006). Indian Academy of Pediatrics and Polio Eradication in India. *Indian Pediatrics*, 43(9), 765-768.

Kaufman, J., & Feldbaum, H. (2009). Diplomacy and the Polio Immunization Boycott in Northern Nigeria. *Health Affairs*, 28(4), 1091-1101.

Kickbusch, I. (2011). Global Health Diplomacy: How Foreign Policy Can Influence Health. *British Medical Journal*, 342.

Kickbusch, I., Silberschmidt, G. & Buss, P. (2007). Global Health Diplomacy: The Need for New Perspectives, Strategic Approaches and Skills in Global Health. *Bulletin of the World Health Organization*, 85(3), 230-232.

Lee, K. & Smith, R. (2011). What is 'Global Health Diplomacy'? A Conceptual Review. *Global Health Governance*, 5(1), 1-12.

Mohammadi, D. (2012). The Final Push for Polio Eradication? *The Lancet*, 380(9840), 460-462.

Nair, V.M. (2002). Polio Eradication – Global Initiative; Strategy Challenged in Kerala, India. *Journal of Public Health Medicine*, 24(3), 207-210.

NPSP. (2005, July 24). India Expert Advisory Group (IEAG). Retrieved January 8, 2009, from:
www.npspindia.org/Advisory.asp.

_____. (2011). AFP Surveillance Bulletin – India (week ending 9 April 2011) . Retrieved April 19, 2011, from:
www.npspindia.org/bulletin.pdf.

Paul, Yash & Dawson, Angus. (2005). Some Ethical Issues Arising from Polio Eradication Programmes in India, *Bioethics*, 19(4), 393-406.

Paul, Y. (2008). OPV Cannot Eradicate Polio from India: Do We Need Any Further Evidence? *Vaccine*, 26(17), 2058-2061.

Puliyel, J., & Madhavi, Y. (2008). Vaccines: Policy for Public Good or Private Profit? *Indian Journal of Medical Research*, 127(1), 1-3.

Puliyel, J., Gupta, M., & Mathew, J. (2007). Polio Eradication & the Future for Other Programmes: Situation Analysis for Strategic Planning in India. *Indian Journal of Medical Research*, 125(1), 1-4.

Puliyel, J., Sathyamala, C., & Banerji, D. (2007). Protective Efficacy of a Monovalent Oral Type 1 Poliovirus Vaccine. *The Lancet*, 370(9582), 129.

Rath, B., et al. (2012). Prioritizing Polio. *Expert Review of Vaccines*, 11(12). 1389-1392.
Roberts, L. (2012). The Polio Emergency. *Science*, 337(6094), 514-516.

Rotary International. (2013). Rotary's Work: PolioPlus Program. Retrieved June 20, 2013, from:
www.rotary.org/en/ServiceAndFellowship/Polio/RotarysWork/Pages/ridefault.aspx.

Sathyamala, C., et al. (2005). Polio Eradication Initiative in India: Deconstructing the GPEI. *International Journal of Health Services*, 35(2), 361-383.

Sutter, R., et al. (2010) Immunogenicity of Bivalent Types 1 and 3 Oral Poliovirus Vaccine: A Randomised, Double-blind, Controlled Trial. *The Lancet*, 376(9753), 1682-1688.

Taylor, S. (2009). Political Epidemiology: Strengthening Socio-Political Analysis for Mass Immunisation Lessons from the Smallpox and Polio Programmes. *Global Public Health*, 4(6), 546-560.

Tebbens, R., et al. (2011). Economic Analysis of the Global Polio Eradication Initiative. *Vaccine*, 29(2), 334-343.

Thacker, N., et al. (2012). Comparison of Attitudes about Polio, Polio Immunization, and Barriers to Polio Eradication Between Primary Health Center Physicians and Private Pediatricians In India. *International Journal of Infectious Diseases*, 16(6), e417-e423.

The Persistence of Polio. (2012). *Nature Medicine*, 18(3), 323.

UNICEF. (2012). What is GPEI? Retrieved 15 November, 2013, from: www.unicef.org/immunization/index_48412.html.

Vashisht, N., & Puliyel, J. (2012). Polio Programme: Let Us Declare Victory and Move On. *Indian Journal of Medical Ethics*, 9(2), 114-117.

Vashishtha, K.M. & Kumar, P. (2013). 50 years of Immunization in India: Progress and Future. *Indian Pediatrics*, 50(1), 111-118.

WHO. (1988). *Global Eradication of Poliomyelitis by the Year 2000*. Forty-first World Health Assembly, Geneva, 2-13 May 1988, WHA 41.28.

_____. (2003). *Global Polio Eradication Initiative Strategic Plan 2004-2008*. Geneva: The World Health Organization.

_____. (2010). *Global Polio Eradication Initiative Strategic Plan 2010-2012*. WHO/Polio/10.01. Geneva: The World Health Organization.

_____. (October 2012a). Poliomyelitis Factsheet No. 114. Retrieved March 1, 2013, from: www.who.int/mediacentre/factsheets/fs114/en/index.html.

_____. (2012b). *Poliomyelitis: Intensification of The Global Eradication Initiative*. Sixty-fifth World Health Assembly, Geneva, May 26, 2012, WHA 65.5.

_____. (2013). *Global Polio Eradication Initiative Polio Eradication & Endgame Strategic Plan 2013-2018* (draft: WHA version, 20 May 2013).

Yadav, K., et al. (2009). Intensified Pulse Polio Immunization: Time Spent and Cost Incurred at a Primary Healthcare Centre. *The National Medical Journal of India*, 22(1), 13-17.

Zarocostas, J. (2011). Gates and Cameron Pledge New Money to Eradicate Polio. *British Medical Journal*, 342(7792), 304.